HCF40107B

DUAL 2-INPUT NAND BUFFER/DRIVER

- 32 TIMES STANDARD B-SERIES OUTPUT CURRENT DRIVE SINKING CAPABILITY - 136 mA TYP. AT V_{DD} = 10V, V_{DS} = 1V
- QUIESCENT CURRENT SPECIF. UP TO 20V
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT I_I = 100nA (MAX) AT V_{DD} = 18V T_A = 25°C
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC JESD13B "STANDARD SPECIFICATIONS FOR DESCRIPTION OF B SERIES CMOS DEVICES"



DIP SOP

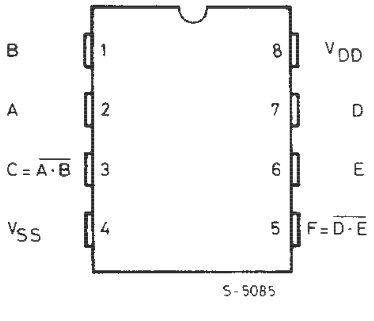
ORDER CODES

PACKAGE	TUBE	T & R
DIP	HCF40107BEY	
SOP	HCF40107BM1	HCF40107M013TR

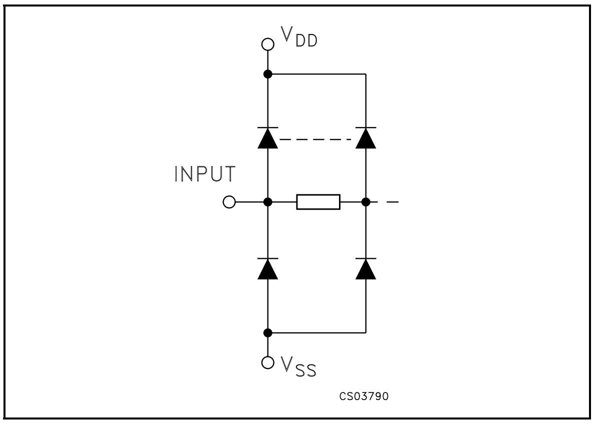
DESCRIPTION

HCF40107B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages.
HCF40107B is a dual 2-input NAND buffer/driver containing two independent 2-input NAND buffers with open-drain single n-channel transistor outputs. This device features a wired-OR capability and high output sink current capability (136 mA typ. at V_{DD} = 10V, V_{DS} = 1V).

PIN CONNECTION



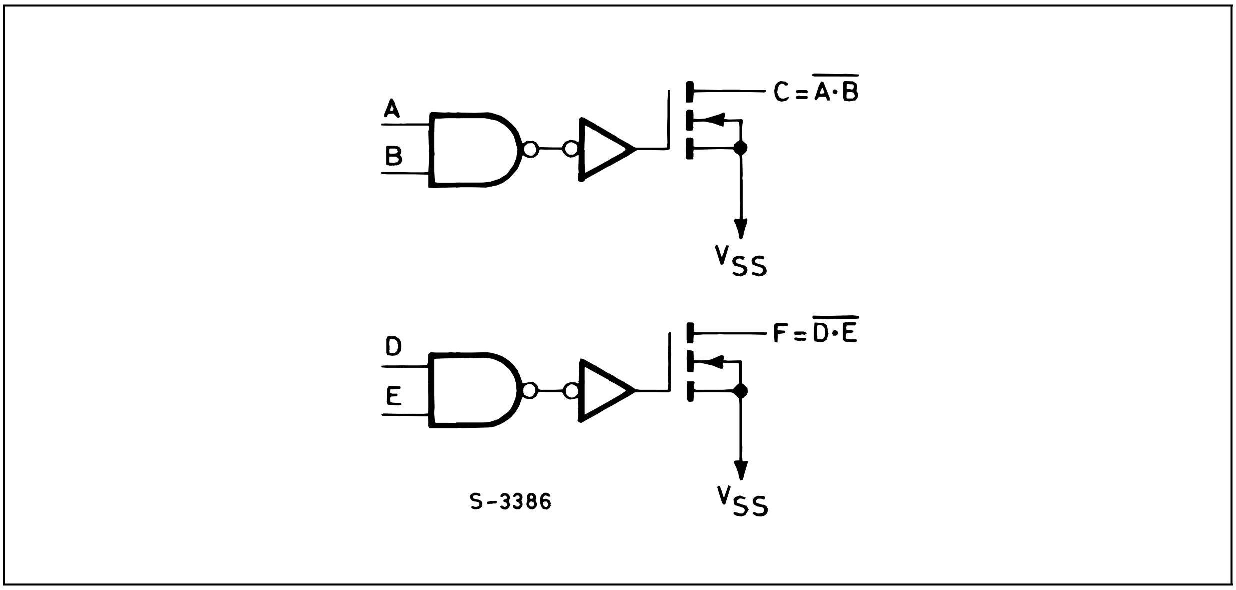
INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
2, 1, 7, 6	A, B, D, E	Input
3, 5	C,F	Outputs
4	V_{SS}	Negative Supply Voltage
8	V_{DD}	Positive Supply Voltage

FUNCTIONAL DIAGRAM

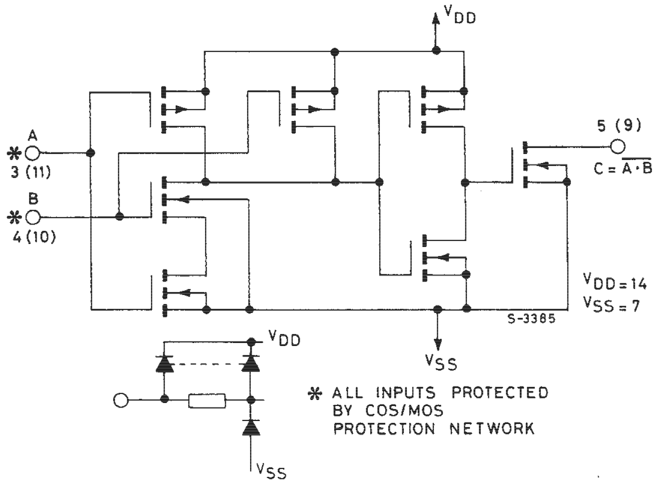


TRUTH TABLE

A	B	C	
L	L	H*	Z#
H	L	H*	Z#
L	H	H*	Z#
H	H	L	

* : Requires external and pull-up resistor (R_L) to V_{DD}.
: Without pull-up resistor (3-state).

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	-0.5 to +22	V
V_I	DC Input Voltage	-0.5 to V_{DD} + 0.5	V
I_I	DC Input Current	± 10	mA
P_D	Power Dissipation per Package	200	mW
	Power Dissipation per Output Transistor	100	mW
T_{op}	Operating Temperature	-55 to +125	°C
T_{stg}	Storage Temperature	-65 to +150	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

All voltage values are referred to V_{SS} pin voltage.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	3 to 20	V
V_I	Input Voltage	0 to V_{DD}	V
T_{op}	Operating Temperature	-55 to 125	°C

DC SPECIFICATIONS

Symbol	Parameter	Test Condition				Value							Unit
		V_I (V)	V_O (V)	$\|I_O\|$ (μA)	V_{DD} (V)	$T_A = 25°C$			-40 to 85°C		-55 to 125°C		
						Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
I_L	Quiescent Current	0/5			5		0.02	5		150		30	μA
		0/10			10		0.02	10		300		60	
		0/15			15		0.02	20		600		120	
		0/20			20		0.04	100		3000		600	
V_{IH}**	High Level Input Voltage		0.5/4.5	<1	5	3.5			3.5		3.5		V
			1/9	<1	10	7			7		7		
			1.5/13.5	<1	15	11			11		11		
V_{IL}**	Low Level Input Voltage		4.5/0.5	<1	5			1.5		1.5		1.5	V
			9/1	<1	10			3		3		3	
			13.5/1.5	<1	15			4		4		4	
I_{OL}	Output Sink Current	5	0.4		5	21	32		16		12		mA
		5	1		5	44	68		30		25		
		10	0.5		10	49	74		37		28		
		10	1		10	89	136		68		51		
		15	0.5		15	66	100		50		38		
I_{OH}	Output Drive Current	No Internal Pull-up Device											mA
I_{IH}, I_{IL}	Input Leakage Current	0/18	Any Input		18		$\pm10^{-5}$	±0.1		±0.1		±1	μA
I_{OH}, I_{OL} ***	3-State Output Leakage Current	0/18	18		18		$\pm10^{-4}$	2		2		20	μA
C_I	Input Capacitance		Any Input				5	7.5					pF
C_O	Output Capacitance		Any Output				30						pF

The Noise Margin for both "1" and "0" level is: 1V min. with V_{DD}=5V, 2V min. with V_{DD}=10V, 2.5V min. with V_{DD}=15V
** Measured with external pull-up resistor, R_L = 10kΩ to V_{DD}.
*** Forced output disabled.

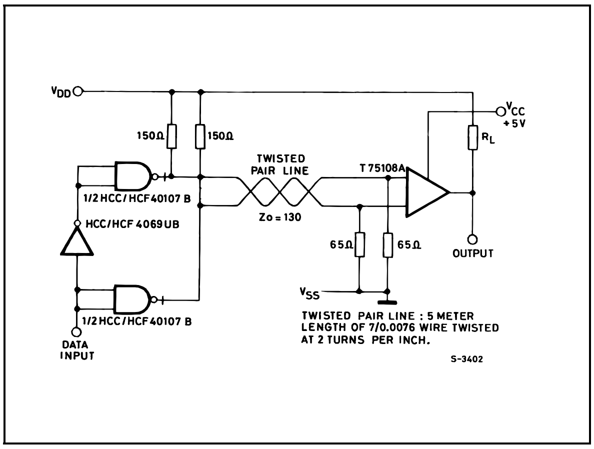
DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 50pF, R_L = 200KΩ, $t_r = t_f$ = 20 ns)

Symbol	Parameter	Test Condition		Value (*)			Unit
		V_{DD} (V)		Min.	Typ.	Max.	
t_{PHL} t_{PLH}	Propagation Delay Time High to Low	5	R_L* = 120Ω		100	200	ns
		10			45	90	
		15			30	60	
	Low to High	5	R_L* = 120Ω		100	200	ns
		10			60	120	
		15			50	100	
t_{THL} t_{TLH}	Transition Time High to Low	5	R_L* = 120Ω		50	100	ns
		10			20	40	
		15			10	20	
	Low to High	5	R_L* = 120Ω		50	100	ns
		10			35	70	
		15			25	50	

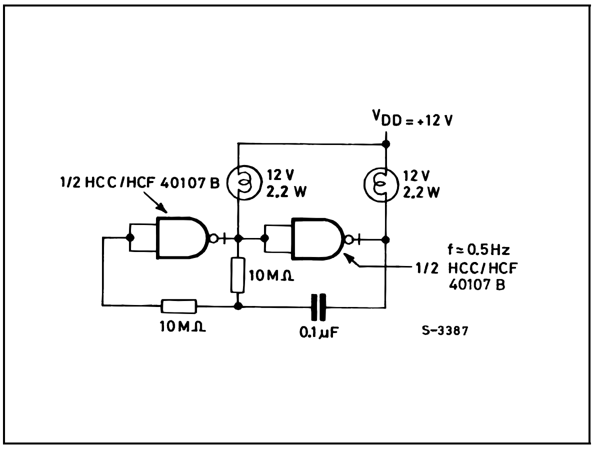
(*) R_L is external pull-up resistor to V_{DD}.

TYPICAL APPLICATIONS

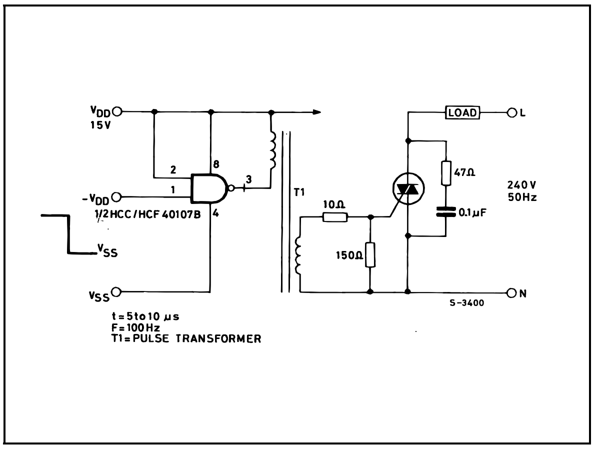
Line-driver Circuit.



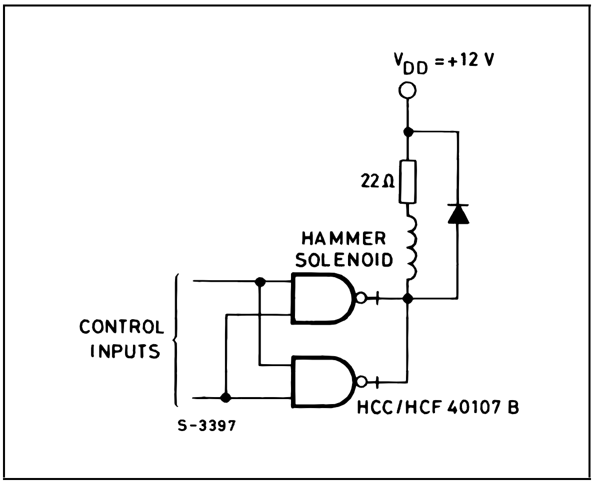
A 2.2-watt Incandescent Lamp-driver Circuit.



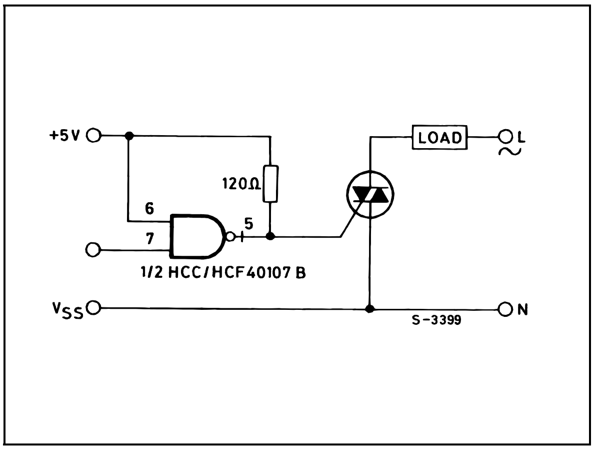
Interface of 40107B with Triac, with COS/MOS Component and Triac isolated.



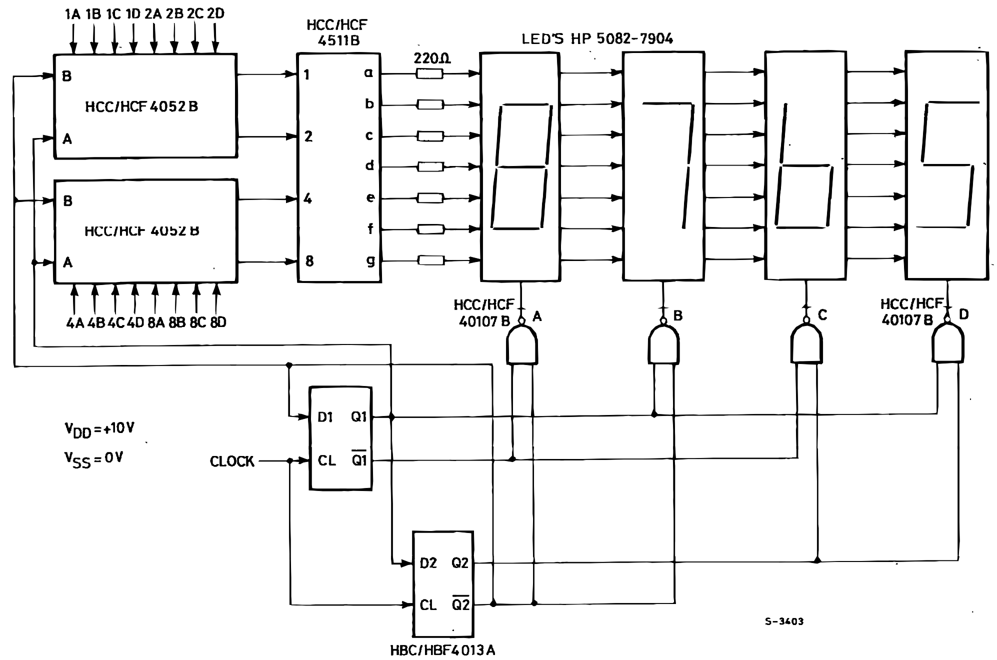
Solenoid Driver Circuit



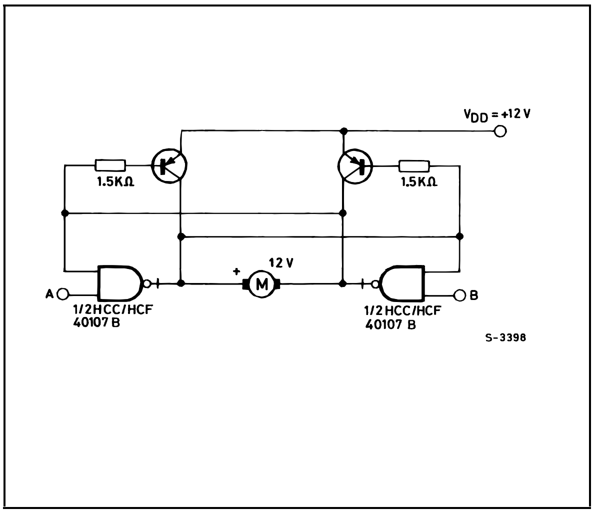
Direct Dc Driver Interface of 40107B with a Triac.



Multiplexed Led Circuit

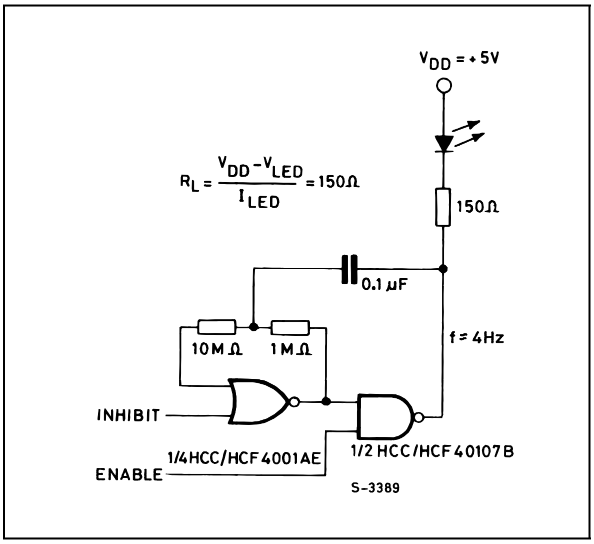


Motor-controller Circuit



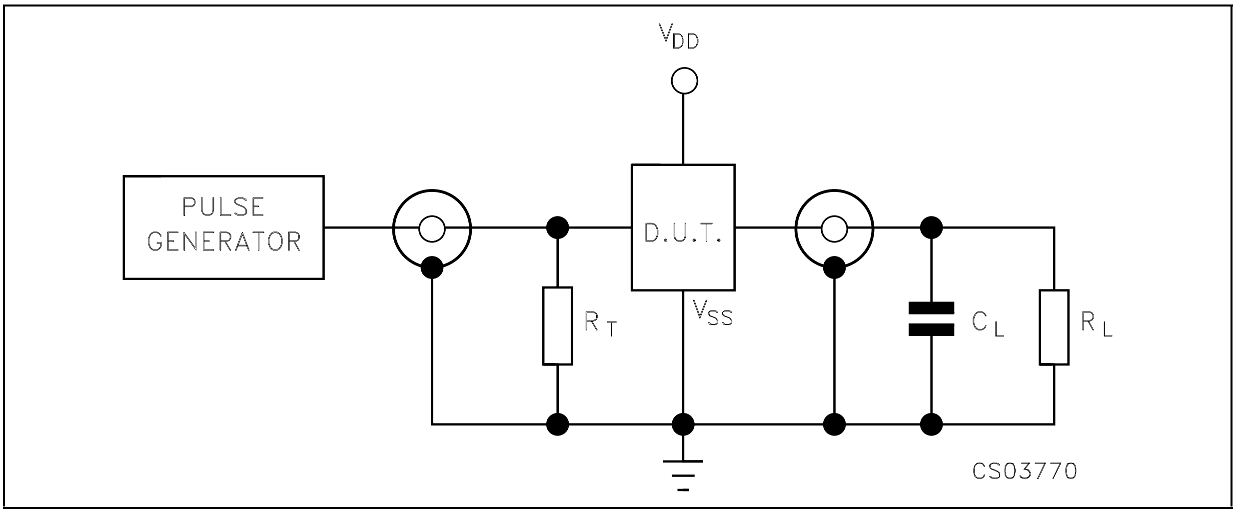
A	B	MOTOR FUNCTION
L	L	OFF
H	L	COUNTER CLOCKWISE
H	H	AS PREVIOUS STATE
L	H	CLOCKWISE
H	H	AS PREVIOUS STATE

Led Driver Circuit



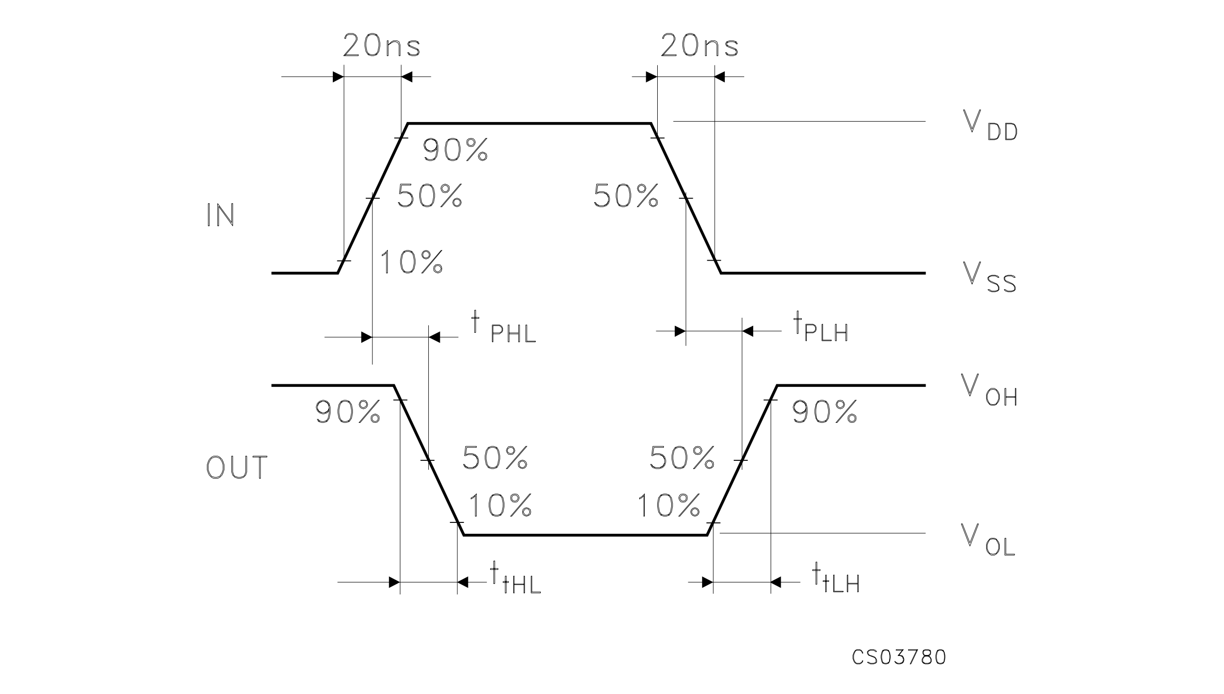
INHIBIT	ENABLE	OUTPUT
L	L	OFF
H	L	OFF
L	H	OFF
L	H	ON

TEST CIRCUIT



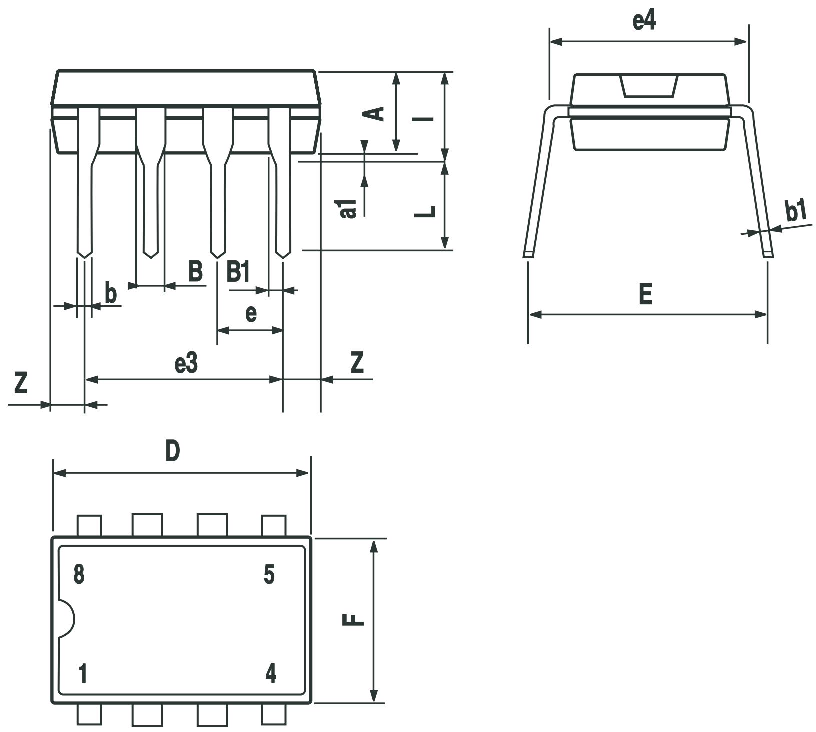
C_L = 50pF or equivalent (includes jig and probe capacitance)
R_L = 200KΩ
R_T = Z_{OUT} of pulse generator (typically 50Ω)

WAVEFORM : PROPAGATION DELAY TIMES (f=1MHz; 50% duty cycle)



Plastic DIP-8 MECHANICAL DATA

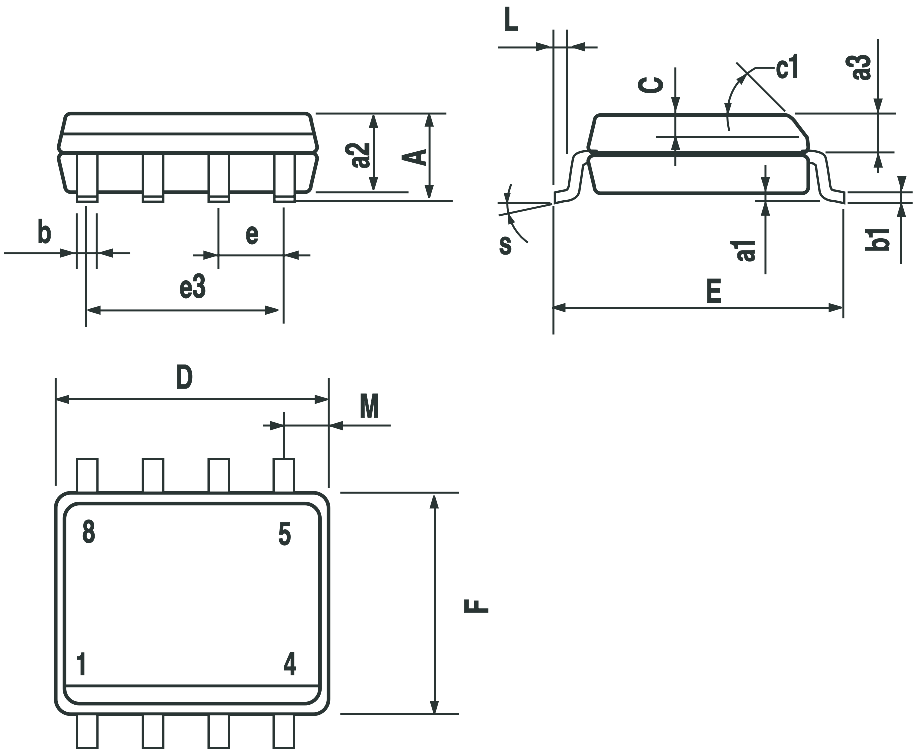
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A		3.3			0.130	
a1	0.7			0.028		
B	1.39		1.65	0.055		0.065
B1	0.91		1.04	0.036		0.041
b		0.5			0.020	
b1	0.38		0.5	0.015		0.020
D			9.8			0.386
E		8.8			0.346	
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			7.1			0.280
I			4.8			0.189
L		3.3			0.130	
Z	0.44		1.6	0.017		0.063



P001F

SO-8 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45° (typ.)					
D	4.8		5.0	0.189		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.149		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8° (max.)					



0016023